High Field MR Research in Drug Abuse: A Bioengineering Research Partnership

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- Bioengineering Center, Department of Electrical Engineering and Computer Science, Tufts University, Medford, MA
- Department of Psychiatry, Boston University School of Medicine, Boston, MA
- Department of Psychiatry and Behavioral Neurosciences, Wayne State University School of Medicine, Detroit, MI

I) Basic Engineering Projects

1. Objective motion detection and correction in time series fMRI experiments.
2. Optimized phased array coil design.

3a. FMRI image registration and signal dropout reduction in brain regions with high susceptibility effects.

II) Applied Engineering Projects

3b. Functional T2 relaxometry of brainstem and midbrain monoaminergic nuclei.

4. Estimation of cerebral blood flow and volume using dynamic susceptibility contrast MRI.
5. Proton echo-planar spectroscopic imaging at 4 T.
6. Two-dimensional, proton magnetic resonance spectroscopy of amino acid neurotransmitters.

III) Technology Extension Projects

7. Current EEG and fMRI assessment of drug-induced alpha wave activity.
8. Concurrent, high resolution near infrared spectroscopy (NIRS) imaging and fMRI.